

The shape of the fruit and of the bud also show the characteristics, and the distinctive three-flowered umbel characteristic of *E. sideroxylon* shows itself in the hybrid form as an occasional three-flowered umbel mixed with multi-flowered umbels of the type derived from *E. albens* (Text-fig. 3).

DISCUSSION.

It is clear from the examination of the above material that in the two species belonging to the anther groups examined there has been interbreeding, and from the widespread occurrence of similar forms it appears that interbreeding between these two particular groups of the genus is especially easy. From information previously obtained, therefore, the grouping of species according to anther shape does not correspond with a pattern of reproductive isolation within the genus, although at some points the grouping of species by anther shape and their genetic relationship is in accord.

Of the anther groups given by Blakely, the relationship of the *Platantherae* to the other groups is not yet known, as this group is almost entirely western and central Australian. Of the remaining four groups, viz., *Macrantherae*, *Renantherae*, *Terminales* and *Porantheroideae*, it is clear that the *Macrantherae* contains a very diverse set of species falling into a number of distinct sub-groups, most of which apparently do not interbreed. All the species within each of the other three groups, viz., *Renantherae*, *Porantheroideae* and *Terminales*, can apparently interbreed with each other. None of the *Macrantherae* seem to be able to interbreed with any of them nor can any of the *Renantherae* interbreed with any other group, but by contrast the *Porantheroideae* and the *Terminales* not only can, but frequently do, interbreed with one another.

Therefore, so far as anther groups are concerned, from a genetic point of view there are complete contradictions—*Porantheroideae* and *Terminales* are a free interbreeding pair of groups which on anther shape are quite morphologically distinct, whereas the *Renantherae* seems to be an entirely isolated group of species which can breed only with members of its own group. In the case of the species belonging to the two anther groups *Terminales* and *Porantheroideae*, there is particular interest, because it is apparent (and to some extent indicated by Blakely himself) that a number of described species are, in fact, hybrids between parents derived one from either of these two groups.

The following species and varieties given by Blakely are almost certainly hybrids and their suggested parentage is stated:

"Species."	Probable Parentage.
affinis	= <i>Caley</i> × <i>albens</i>
Auburnensis	= <i>meliiodora</i> × <i>melanophloa</i>
Blackburniana	= <i>odorata</i> × <i>sideroxylon</i>
calcicultrix var. obscura	= <i>odorata</i> × <i>fasciculosa</i>
Ednaeana	= <i>sideroxylon</i> × <i>microcarpa</i>
Forsythii	= <i>meliiodora</i> × <i>crebra</i> *
hybrida	= <i>hemiphloa</i> × <i>paniculata</i>
jugalis	= <i>odorata</i> × <i>leucoxyton</i>
Murphyi	= <i>crebra</i> × <i>conica</i>
odorata var. refracta	= <i>odorata</i> × <i>leucoxyton</i>
Taylori	= <i>crebra</i> × <i>conica</i>
tennandrensis	= <i>meliiodora</i> × <i>crebra</i>

There are, no doubt, a number of other combinations which can be found, as, indeed, in the case discussed above of *E. sideroxylon* × *E. albens*, or *E. leucoxyton* × *E. microcarpa* which has been located in the field near Inglewood, Victoria, but which have not been described in any taxonomic work.

Wherever field junctions can be found between two species belonging one to either of these groups it is highly probable that some hybrid trees exist (Pryor, 1953).

Blakely's presentation of these "species" is not consistent, although in general he hints at, or recognizes, their probable origin. There is no doubt that he was to some

* *E. crebra* is the correct name for the species listed by Blakely (1934) as *E. racemosa*. The latter name is correctly applied to quite a different species.

extent aware of the position, and other workers at that time were also acquainted with the probable explanation of these facts. For example, Cambage (1908) describes precisely and suggests the origin of *E. affinis* in his account of the occurrence of this tree at the junction of stands of *E. Caleyi* and *E. albens* near Torrington.

The above discussion has been confined to hybrids between pairs of species belonging one each to Terminales and Porantheroideae, but it is clear that a similar situation exists between species belonging to the same anther group in this pair. In the Porantheroideae hybrids have been found in the field between *E. microcarpa* and *E. albens*; *E. melanophloia* and *E. albens*, and a number of other combinations which, however, will be discussed elsewhere, and at the same time between members of the Terminales, such as *E. leucoxyton* × *E. melliodora* and *E. sideroxyton* × *E. leucoxyton*.

SUMMARY.

As a result of floral examination and progeny testing of trees from a hybrid swarm of *E. sideroxyton* and *E. albens*, it is deduced that anther group within the genus *Eucalyptus* does not correspond with interbreeding groups, although at some points they are in agreement. The inheritance of anther shape in hybrids between species in the Terminales and Porantheroideae is shown to be subject to the same kind of combinations as other morphological inheritance within the genus, such as juvenile leaf shape.

A number of "species" quoted by Blakely are very likely hybrids between parents belonging one to each of these two anther groups.

References.

- BENTHAM, G., 1863-1878.—Flora Australiensis, London.
 BLAKELY, W. F., 1934.—A Key to the Eucalypts.
 BURBIDGE, N., 1947.—*Trans. Roy. Soc. S. Aust.*, 71: 137-163.
 CAMBAGE, R. H., 1908.—*PROC. LINN. SOC. N.S.W.*, xxxiii: 45-65.
 MAIDEN, J. H., 1924.—A Critical Revision of the genus *Eucalyptus*. Government Printer, N.S.W.
 MUELLE, F. v., 1882-1884.—*Eucalyptographia*. Government Printer, Victoria.
 PRYOR, L. D., 1951.—*PROC. LINN. SOC. N.S.W.*, lxxvi: 140-148.
 ———, 1952.—*PROC. LINN. SOC. N.S.W.*, lxxvii: 361-363
 ———, 1952a.—*PROC. LINN. SOC. N.S.W.*, lxxvii: 364-368.

EXPLANATION OF PLATES III-IV.

Plate iii.

1-3.—Hybrids between *E. sideroxyton* and *E. albens*. 1, Tree No. 9; 2, Tree No. 10; 3, Tree No. 8. 4.—Tree No. 23, *E. sideroxyton*. 5.—Tree No. 24, *E. albens*, outlines of anthers of hybrids and parents.

Plate iv.

1.—An anther of *E. sideroxyton*. 2.—Tree No. 24, an anther of *E. albens*. 3.—An anther of hybrid No. 9. 4.—The anther range of *E. sideroxyton*, Tree No. 23; note the sterile tipped staminodia to the left. 5.—Tree No. 10; note the glands on the tips of the two staminodia on the right. 6.—Anthers of *E. albens*.

AN UNDESCRIBED SPECIES OF *GREVILLEA* FROM THE RYLSTONE DISTRICT.

By H. S. MCKEE.

[Read 27th May, 1953.]

GREVILLEA EVANSIANA, sp. nov.

Frutex erectus vel nonnunquam semiprostratus, 0.2-2 m. altus, intricatus, ramosissimus; ramis gracilibus; ramulis novellis angulatis sparse pubescentibusque; foliis breviter petiolatis, margine integra, 2.5-6 cm. longis, 0.5-1 cm. latis, oblongo-lanceolatis, rariter lineari-lanceolatis, obtusis, acuminibus callosis, supra viridibus laevibus glabrisque, subtus pilis sericeis copiose indutis; nervis tenuibus (praeter medium), medio prominenti, lateralibus vix conspicuis supra subtusque; alabastris tomentosis, robiginosis; racemis terminalibus, subsphaericis, compactissimis; pedunculis brevibus, robustis; pedicellis brevissimis, crassis, hirsutis; floribus 10-40, subsessilibus; perianthio extra argenteo-hirsuto, intus barbato, segmentibus oblongo-lanceolatis, 5 mm. longis, 2 mm. latis, apicibus connatis dense tectis crinibus robiginosis; stylo 6-8 mm. longo, curvato, glabro, rubido vel rarius viridi; disco stigmatico rotundo, late conico, nitido, 1 mm. lato, sublateraliter posito; fructu oblique cylindrico, extra nigro, intus robiginoso, 10-12 mm. longo, stylo neglecto, 4-6 mm. lato; seminibus anguste ovatis, ad funiculum obtusis, ad apicem acutis, dorsaliter convexis, ventraliter concavis, marginibus revolutis. Habitat in rupibus prope fluminem Cudgegong in regione Rylstonense.

Hanc plantam dicavi dignissimi O. D. Evans, cujus benignitati ego, cum multis aliis, primum introductionem ad cognitionem plantarum Novo-Austro-Cambriae debeo.

An erect, occasionally semi-prostrate, intricately branched shrub, 0.2-2 m. high. Branches slender, young shoots angular, sparsely pubescent. Leaves shortly petiolate, entire, 2.5-6 cm. long, 0.5-1 cm. wide, oblong-lanceolate, rarely linear-lanceolate, obtuse with a small callous point; green, smooth and glabrous above, densely covered with silky hairs below. Midrib prominent, lateral veins indistinct above and below. Buds covered with long rust-coloured hairs. Racemes terminal, very dense, almost spherical, on short stout peduncles. Pedicels very short, thick, hairy. 10-40 flowers per raceme. Perianth covered with silky hairs outside, bearded inside, with oblong-lanceolate segments 5 mm. long, 2 mm. wide, connate at the apex and there densely covered with rust-coloured hairs. Style dark red, rarely green. Stigmatic disc circular in outline, broadly conical, shining, 1 mm. wide. Fruit obliquely cylindrical, black outside, rusty brown inside, 10-12 mm. long without the persistent style, 4-6 mm. wide. Seeds narrow, ovate, obtuse at funicular end, acute at apex, convex above, concave below, with revolute margins.

The species is named after Mr. O. D. Evans, Department of Botany, University of Sydney, to whom I, like many others, owe my first introduction to the study of the flora of New South Wales.

The following specimens have been examined: H. S. McKee s.n., 4.6.1950 (NSW 22648), buds; L. A. S. Johnson, 1.9.51 (NSW 22649), frs.; L. A. S. Johnson, 2.9.51 (NSW 22650), frs.; H. S. McKee s.n., 2.9.51 (NSW 22651), frs., holotype; C. K. Ingram, 28.8.52 (NSW 22652), frs.; H. S. McKee 21, 21.9.52 (NSW 22653), buds; H. S. McKee 51, 22.9.52 (NSW 22654), frs.; H. S. McKee 52, 22.9.52 (NSW 22655), frs.; H. S. McKee 53, 22.9.52 (NSW 22656), frs.; H. S. McKee 54, 22.9.52 (NSW 22657), frs.; H. S. McKee 469, 10.1.53 (NSW 22658), frts.; H. S. McKee 470, 11.1.53 (NSW 22659), frts.

Comparatively little variation has been noted within the species. McKee 21 represents a form with short, broad leaves, McKee 51 a form with leaves rather longer than usual. McKee 52 and McKee 54 represent a form with green flowers, known only

from a few plants growing near one another. The style, stigma and base of the perianth were green, with only a faint tinge of pink at the upper end of the style, and of brown at the apex of the perianth. In typical flowers the style is dark red and the perianth reddish-brown.

The species is known only from a small area about 15 miles east of Rylstone, N.S.W., on the road from Olinda to Mount Coricudgy. The locality lies south of the dam on the Cudgegong River and is known in the district by the alternative names of "Khyber Pass" and "Curran's Mountain Gap", neither of which seems to figure on maps. It lies at about 2400' and consists of sandy ground broken by a complex set of ridges and pinnacles of Permian sandstone. The present species, together with several other plants which are rare or unknown elsewhere, is confined to the tops and sides of these rocky outcrops. It is, however, one of the most abundant plants in many parts of this restricted area.

The nearest affinities of the species are with *Grevillea capitellata* Meissn., and especially with a broad-leaved form now referred to that species, but which it is understood is to be described as a separate species by Mr. L. A. S. Johnson, of the National Herbarium of New South Wales.

AUSTRALIAN FUNGI.
NEW SPECIES AND REVISIONS.

I. THE MELIOLACEAE OF AUSTRALIA.

By C. G. HANSFORD, Sc.D., Waite Agricultural Research Institute,
University of Adelaide.

(Forty-two Text-figures.)

[Read 24th June, 1953.]

In this paper an attempt has been made to include all species hitherto recorded in Australia and belonging to the Meliolaceae. All are parasites of living plants, mostly occurring on leaves, though a few attack also young stems, and forming black rounded colonies on the surface of these parts, sometimes thick and velvety with the erect setae, but more often quite thin and almost smooth. I am indebted to the authorities in charge of the following Herbaria for their co-operation in allowing me to examine their collections: The University of Melbourne, The University of Tasmania, the Departments of Agriculture in Victoria and New South Wales, the Brisbane Botanical Garden (through Dr. R. F. Langdon), as well as to several private collectors, especially Dr. Lillian Fraser. A few of the older collections were received from the Royal Botanic Gardens, Kew. I am particularly grateful to the staff of the National Herbarium of New South Wales for correction of the names of the host plants.

Each species of *Meliola* and related genera is restricted to comparatively a narrow range of hosts, often to a single genus or to a group of species within a genus, and rarely occurs on hosts belonging to more than a single family. Hence it is convenient to describe the Australian species under the headings of the host families on which they have been recorded: in the following pages these host families have been arranged in alphabetical order for convenience of reference.

Family APOCYNACEAE.

(1) *MELIOLA MELODINI* Hansf., n. sp. (3111.5323). (Fig. 1.)

Plagulae epiphyllae, usque ad 2 mm. diam., tenues, subvelutinae. Mycelium ex hyphis atrobrunneis, subrectis vel leniter undulatis, 6-8 μ crassis (cellulis plerumque circa 25 μ longis), opposite acuteque ramosis, laxe reticulatis compositum. Hyphopodia capitata alternata, plus minusve antrorsa, recta vel curvula, 25-35 μ longa, cellula basali cylindracea, 6-13 μ longa, cellula apicali cylindracea vel ovata, integra, 16-23 \times 8-11 μ . Hyphopodia mucronata in hyphis distinctis evoluta, opposita vel alternata, ampullacea, curvata, 15-24 \times 6-8 μ , collo suberecto, 3 μ crasso praedita. Setae myceliales sat numerosae, dispersae, erectae, rectae, simplices, acutae, usque ad 700 \times 9-11 μ . Perithecia dispersa, atra, globosa, verrucosa, usque ad 160 μ diam. Sporae atrobrunneae, cylindraceae utrinque rotundatae, 4-septatae, constrictae, 45-52 \times 19-21 μ .

Hab. in foliis *Melodini australis*, National Park, N.S.W., leg. L. Fraser 224.

Colonies epiphyllous, to 2 mm. diam., rather thin, thinly velvety. Mycelium of substraight to slightly undulate dark brown hyphae 6-8 μ thick, the cells mostly about 25 μ long, branching usually opposite at acute angles, loosely reticulate. Capitulate hyphopodia alternate, more or less antrorse, straight or bent, 25-35 μ long; stalk cell cylindrical, 6-13 μ long; head cell ovate-cylindrical, entire, 16-23 \times 8-11 μ , widely rounded at apex. Mucronate hyphopodia on separate mycelial branches, opposite or alternate, bent ampulliform, 15-24 \times 6-8 μ , neck upturned, 3 μ thick. Mycelial setae rather numerous, scattered, erect, straight, simple, when fully mature acute, up to 700 \times 9-11 μ . Perithecia scattered, black, globose, verrucose, up to 160 μ diam. Spores dark brown, cylindrical, obtuse, 4-septate, constricted, 45-52 \times 19-21 μ .

(2) *MELIOLA CARISSAE* Doidge, var. *PARSONSIAE* Hansf., n. var. (3111.4232). (Fig. 2.)

Plagulae epiphyllae, atrae, 1-2 mm. diam., densae, subcrustosae, velutinae. Mycelium ex hyphis atrobrunneis, subrectis vel undulatis, 8-9 μ crassis (cellulis plerumque 15-20 μ longis), opposite vel irregulariter ramosis (circa 45°), dense reticulatis compositum, in centro plagularum subsolidum. Hyphopodia capitata alternata, antrorsa, recta vel varie curvata, 18-30 μ longa, cellula basali cylindracea vel cuneata, 5-11 μ longa, cellula apicali versiformia, irregulariter rotundato-lobata, 12-23 \times 12-18 μ . Hyphopodia mucronata plerumque in hyphis distinctis evoluta, opposita vel alternata, ampullacea, curvata, 15-22 \times 7-9 μ , collo suberecto, 3-4 μ crasso praedita. Setae myceliales numerosae, dispersae etiam juxta perithecia aggregatae, erectae, rectae, simplices, acutae vel subacutae, usque ad 480 \times 10-11 μ . Perithecia dispersa, atra, globosa, verrucosa, usque ad 220 μ diam. Sporae atrobrunneae, cylindraceae vel ellipsoideae, obtusae, 4-septatae, leniter constrictae, 45-51 \times 18-21 μ .

Hab. in foliis *Parsonsiae stramineae*, Currumbin Creek, Qld., C. T. White 10 (typus in Herb. Queensland, Brisbane); National Park, N.S.W., Fraser 91, 162; Williams R., N.S.W., Fraser 129; Orara, N.S.W., Fraser 187; Clyde Mountain, N.S.W., Fraser 169.

Colonies epiphyllous (in later collections also hypophyllous), dense, black, velvety, often subcrustose, 1-2 mm. diam. or sometimes confluent and larger. Mycelium of dark brown hyphae 8-9 μ thick, the cells mostly 15-20 μ long, more or less straight on upper surface of leaf, undulate to flexuous below, branching opposite or irregular at acute angles, densely reticulate and often forming almost a solid plate in centre of older colonies. Capitulate hyphopodia alternate, more or less antrorse, straight or variously bent, 18-30 μ long; stalk cell cylindric, 5-11 μ long; head cell versiform, irregularly sinuate-lobed or often 3-stellate, 13-21 \times 9-17 μ (in type 12-23 \times 12-18 μ). Mucronate hyphopodia mostly on separate hyphae towards the centre of the colony, alternate or opposite, bent ampulliform, 15-22 \times 7-9 μ , neck upturned, 3-4 μ thick. Mycelial setae numerous, closely scattered and also grouped around the perithecia, erect, straight, simple, acute or somewhat obtuse, up to 480 \times 10-11 μ . Perithecia closely scattered, black, globose, verrucose, up to 220 μ diam. Spores dark brown, cylindric, the ends obtusely rounded, 4-septate, slightly constricted, 45-51 \times 18-21 μ .

These Australian collections also resemble *Meliola laevigata* Syd., known only from a single collection on *Paralstonia*, Philippine Is., and I am inclined to reduce this species to varietal status under the much better known *M. carissae* from South and East Africa, in spite of Sydow's species being of older date.

Family CUNONIACEAE.

(3) *IRENE MEGALONGENSIS* Hansf., n. sp. (2201.5230). (Fig. 3.)

Plagulae amphigenae, usque ad 5 mm. diam., subtenues, leves. Mycelium ex hyphis atrobrunneis, undulatis vel flexuosis, 6-8 μ crassis (cellulis plerumque 25-35 μ longis), alternatim vel irregulariter ramosis, laxe reticulatis compositum. Hyphopodia capitata alternata, saepe curvata, 25-35 μ longa, cellula basali cuneata vel cylindracea, 6-14 μ longa, cellula apicali irregulariter lobata, saepe fortiter curvata, 15-22 \times 10-17 μ , versiformia. Hyphopodia mucronata pauca, illis capitatis commixta, alternata, ampullacea, curvata, 20-25 \times 7-9 μ , collo suberecto, 3-4 μ crasso praedita. Setae myceliales nullae. Perithecia laxe dispersa, atra, globosa, usque ad 250 μ diam., superne cellulis pluribus parietis in appendicibus productis; appendices larviformes, erecto-patentes, curvatae, dilute brunneae, continuae, transverse striatae, apice obtusae, usque ad 75 \times 15 μ , sursum leniter attenuatae, tenuiter truncatae. Sporae atrobrunneae, cylindraceae vel ellipsoideae, obtusae, 3-septatae, leniter constrictae, 44-51 \times 16-19 μ , cellulis mediis longioribus.

Hab. in foliis *Ceratopetalii apetalii*, Megalong Valley, Blackheath, N.S.W., Fraser 209 (typus in Herb. Dept. Agric., Sydney); *loc. cit.*, Fraser 179; Wahroonga, N.S.W., Fraser 166 p.p.;

in foliis *Ackamae paniculatae*, Williams R., N.S.W., Fraser 214, 157, 130; Hastings R., N.S.W., Fraser, s.n. (April, 1952).

Colonies amphigenous, to 5 mm. diam., rather thin, smooth. Mycelium of undulate to crooked dark brown hyphae, 6-8 μ thick, the cells mostly 25-35 μ long, branching